Journal of Agricultural Science and Engineering
Vol. 1, No. 4, 2015, pp. 168-177
http://www.aiscience.org/journal/jase

The Impact of Some Agricultural Management Practidces on Growth, Yield of *Proboscidea parviflora*

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Abstract

In order to study the effect of sowing date, plant spacing and urea application on growth component and yield component and the antimicrobial activities of *Proboscidea parviflora* a field experiment was carried out in the split-split plot design with the three sowing dates as the main-plot i.e. (Summer), (Autumn) and (Winter) and three levels of nitrogen as sub plot (N0), (N1) and (N2), and three plant spacing sub-plot i.e. (45 cm), (60 cm) and (75 cm) apart in the ridge at the experimental farm of the University of Khartoum, at Shambat, Sudan during 2007-2008 cropping season. The results showed that seed yield was significantly affected by sowing time, planting spacing and N application. The three ways interaction was significant among seed yield was significant in both years, and highest value of yield was recorded in summer associated with 50kg urea/fed and the widest planting spacing (75cm.) in both years. The highest values of oil percentage in seed were associated with summer sowing followed by winter. Addition of N affected oil yield negatively so do plant spacing. The interaction between sowing time and N application on oil content was significant, while it's wasn't between the other factors studied. The two mould species were affected and controlled by the alcoholic extract of the leaves and stems of *Proboscidea parviflora.* Alcohol also had affected the mould by inhibiting their growth but lesser than leaves extract. The effect of stem extract was better than leaves extracts and alcohol against the two fungi.

Keywords

Edible Oil, Baskets, Martyniaceae, Snake Bite, Medicinal Plant

Received: February 26, 2015 / Accepted: August 22, 2015 / Published online: September 2, 2015

1. Introduction

The use of botanical raw material is in many cases much cheaper than using alternative chemical substances. An estimated number of 70,000 plant species are used in folk medicine worldwide (Farnsworth and Soejarto 1991). As a consequence, there is an enormous demand in plants – for domestic use and for commercial trade–resulting in a huge trade on local, regional, national and international level. As the production of botanicals still relies to a large degree on wild-collection (Bhattarai 1997; He and Ning 1997; Lange 1998; 2002; Robbins 1999; Kathe *et al*., 2003), profound knowledge of trade, size, structure and reams as well as of commodities, traded quantities and their origin is essential for assessing its impact on the plant populations concerned.

Devil's claws are best characterized by their long, pointed claws. When dry, hooked claw readily attaches to passing furry-legged mammals, including the sock-wearing variety (Bertting, 1982). Devil's claw or cat's claw (English), Una de gato has been founded in Zalingei a few years ago and used traditionally by the practioners to remedy scorpion and snake bite, also in magic for preparing some medicine, and they called it Damin Asharah.

Proboscidea parviflora (*Martyniaceae)* belongs to a small New World family comprised of a small number of species

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from even fewer genera. It is often cited as belonging to the family Martyniaceae, so some sources have placed it in the same family as sesame (*Pedliaceae*).

The claws of the mature seedpods of devil's claw were collected in autumn, split and used to create black basketry designs by many tribes in southern California and the Southwest. These tribes include the Chemehuevi, Kawaiisu, Owens Valley Paiute, Tubatulabal, Havasupai, Papago, and Pima. Because the claws are durable, they were often used to construct the base of baskets among the Papago and Pima. The material is still gathered wild or plants are cultivated in home gardens by contemporary weavers. The Papago used the young pods as food, while the Pima cracked the seeds between the teeth and ate them like pine-nuts. To treat rheumatic pains, the Pima broke off a small piece of the claw and pressed it into the flesh, then lighted it and allowed it to burn (Rea, 1997).

2. Material and Methods

The experiments was conducted for two consecutive seasons during the year 2006/07 and 2007/08 in the Demonstrated Farm of the Faculty of Agriculture at Shambat (Latitude 15° 40¯ N, longitude 32° 32¯) and altitude 280 M above sea level) the soil of the experimental site is clay (fine Montmorilonitic, Isoherperthermic, Entic Chromustert, and it's Physical properties as described by Mohammed (1999) are shown in Appendix Table 2.

The climate of the experimental site is semi – desert, with mean annual rainfall about 100 – 200 mm. and with maximum temperature about 42°C in summer and the minimum around 12°C in winter (Adam, 1996). Monthly mean maximum and minimum temperature, relative humidity, solar radiation, and total rainfall were recorded for the two seasons

The Seeds:

The seeds used in this experiment were collected from the area of Zalingei Province in Western Darfur State; where the plant grows wildly around the area.

Experimental Treatments:

The experiment was designed to study the effect of sowing date, nitrogen fertilizer, and plant population on growth and yield of devil's claw as follow:

Sowing date:

- First of April. 13\4
- First of August. 1\8
- First of November. 12\11

Nitrogen Fertilizer Application:

- Control.
- 50 kg Urea / fed.
- 100 kg Urea / fed.

Plant Spacing:

1. 45 cm. between plants.
2. 60 cm. between plants.
3. 75 cm. between plants.

Data collection:

Data were collected on the following parameters from five tagged plants from each plot which were counted weekly.

Growth parameter:

1. Plant Height (cm).
2. Number of leaves/plant.
3. Number of the Branches per plant.
4. Number of the sub Branches per plant.

Reproductive parameters:

1. Number of Fruits:

Numbers of fruits were counted weekly when its start ripening and finally the mean number of the fruits per plant.

2. Number of seeds per plant:

Number of seed per capsule was counted from the tagged plants.

3. 1000 Seeds Weigh:

1000 seed weight was determined by weighing a five replicate of 1000 seeds each using sensitive balance.

4. Dry Matter:

Determined by weighing the fresh weight and the dry weight of the whole plant of the five plants and calculate the variation between them to find out the percentage.

Oil Extractions:

- Total oil content of the seed was determined according to Calmen (1970), as follows:
- Finely ground seeds were extracted by petroleum ether (60–80ºC) in continuous soxhelt extracting apparatus. The ground sample (20g) was accurately weighed in an empty thimble of known weight plugged with a piece of cotton wool then the thimble with the materials was placed in soxhelt extractor.

3. Result and Discussion

Effect of Sowing Date, Planting Spacing and N Fertilizer on 50% Emergence and Flowering:

Summer, autumn and winter sowing dates were characterized by the same number days to 50% emergence during both years. This might be due to the similarity of minimum temperature (26.6-31°C), which prevailed during the germination period. This result agrees with the finding of Kandri *et al.*, 2008 who reported that increasing the temperature reduces days to 50% germination (Table No 1).

Sowing date affected on flowering of *Proboscidea parviflora*, due to temperature and light that have an induction effect on flowering. The number of days to 50% flowering was on the other hand shorter in summer and autumn (20 days) than winter (25 days) in the first year, while in the next year they reached 50% flowering after (20 days) this could be attributed to relatively wide range of temperature during vegetative growth which might have helped in earlier induction of flowering (Table No 1). The results obtained from the present experiment agree with the findings of Burgstaler (1984) who reported that increasing in temperature decreases days of flowering of *Lipidium sativum* L.

Table (1). Days to 50% Emergence and Flowering.

	First Year		**Second Year**	
	50% Emergence	**50% Flowering**	**50% Emergence**	**50% Flowering**
	Days	**Days**	**Days**	**Days**
Summer	4	20	3	20
Autumn	3	20	4	20
Winter	4	25	4	20

Effect of Sowing Date, Planting Spacing and N Fertilizer on Growth and Growth Parameters:

Data Presented in Tables (2-3) indicated that all vegetative growth were significantly affected by sowing dates. Plants sown in summer gave the highest values for all parameters (Plant Height and number of Sub-branches but not for number of leaves where the highest values recoded in autumn followed by summer and winter) for both years, and for number of branches where the greatest values recorded in summer in the first year and autumn in the second year, therefore, it was reflect positively on the growth and yield component in contrast with winter sowing date. The significant effect of sowing dates might be attributed to the fact that their plants had enough time to produce their maximum vegetative growth before weather condition was conductive to flower induction i.e. prevalence of high temperature. On the other hand with late sowing dates flower inducing environment prevailed before plants had reached their maximum vegetative growth capacity.

The two way interactions between factors studied showed highly significant ($P= 0.05$) among plant height and no of leaves, no of branches and no of secondary branches in both year.

The three ways interaction showed significant difference among plant height only in the first year, while for number of leaves/plant and number of branches/plant the three way interaction resulted in significant different only in the second year. There were no significant differences among number of secondary branches in the three way interaction in both years.

These results confirm the observations of Ramzan *et al.,* (1992) who reported that plant height was generally reduced in delayed sowing in case of mung-bean, Also the finding of Sharif (2003) who stated that the highest plant height of okra was recorded when Okra was sawn on March (summer). The reported results also agrees with Malik *et al*., (2006) who confirmed that sowing dates and planting patterns on growth and yield of *Vigna radiate* had significant effect on plant height. Significantly higher plant height (85.51 cm) was attained in D1 (3rd week of June sowing) while minimum plant height (64.73 cm) was recorded in D3 (3rd week of July sowing). Similar observations were found in the study of Naguib *et al*., (2007) who stated that plants sown in October produced the highest plant height than those sown in December.

Planting spacing affect number of leaves significantly, plants sown in autumn produced the greatest values of leaves followed by summer and winter in both seasons. AL Abdulsalam and Hamaiel (2004) studied the Effect of Planting Dates and Compouned Fertilizers on Growth, Yield and Quality of Hassawi Onion under Al-Hassa Oasis Conditions reported that the plant growth parameter increased significantly for October than September and November planting dates, except neck shape index which was significantly higher for November than other planting dates. The significant higher growth in October could be due to moderate climatic condition than either September (being relatively hot) or November (being relatively cool) months. Because extreme climatic. Conditions during September and November, might have advance affected the condition and plant growth than October plantation. Similar results are observed by other investigators. This finding was in conformity with the findings of Naguib *et al.,* (2007) who studied the Response of *Ruta graveolens* L. to Sowing Dates and Foliar Micronutrients stated that seeds planted on 1st of October, produced significantly the highest plants, more branches and the heaviest weight of leaves and stems, compared to those planted on the 1st of November. The reported results also agrees with Malik *et al*., (2006) who stated that sowing dates and planting patterns significantly affected the leaf area per plant at flowering. Maximum leaf area (1465.72 cm2) was produced by D1 (3rd week of June) against minimum (1141.34 cm2) by D3 (3rd week of July). Maximum leaf area in D1 may be due to long vegetative period and high rainfall which favored more vegetative growth.

Number of branches and sub-branches was affected significantly by time of sowing in the two years. The highest values were produced in the first sowing date (Summer) followed by Autumn and Winter this might be due to short vegetative growth period and long reproductive growth period. These results confirmed with the finding of Malik *et al.,* (2006) who said that maximum number of pod bearing branches (5.8) was attained by D3. Significantly minimum number of fruit bearing branches (3.36) was recorded in D1. These findings confirm the findings of Alam *et al*., (2007) who confirmed that the highest number of branches plant-1 (5.20) was obtained in 26 February sowing which was statistically different from 10 and 22 March sowing (4.68 and 4.48).

The differences in plants height were not significantly different in the first season while there were significant (P= 0.05) differences among fertilizer applications. The longer plants in height produced in application of 50 kg Urea/ fed. While more rates of Urea decreases plant height. Urea fertilizer affects leaves production negatively. Number of leaves decreases with the increase of Urea. The effect of fertilizer on number of branches and sub-branches were not significantly different in both of the two seasons. These results confirmed the finding of Makinde *et al*., 2007 who said that the average number of leaves per plant was significantly affected by fertilizer applications? 4 tons ha-1had an average of 68 leaves per plant at 4 WAP, which was significantly higher than the 39 leaves per plant, observed from the control plots. Similar observation agrees with the findings of Salem (2006) who studied the Effect of Nitrogen Levels, Plant Spacing and Time of Farmyard Manure Application on the Productivity of Rice and stated that the interaction between time of FYM application and nitrogen levels on leaf area index was significant in both seasons.

Table (2). Effect of sowing date, plant spacing and N fertilizer on 1000 seed weight in the 1st year (kg).

The Main Effects

Date		**Fertilizer**		**Spacing**	
Summer	75.74^{a}	N_0	69.15^{a}	S_1	68.12^{b}
Autumn	53.49^{b}	N_1	71.74^{a}	S_2	71.09^{ab}
Winter	82.63^{a}	N_2	70.96^{a}	S_3	72.64^{a}
LSD $_{0.05}$	7.38*		4.27*		4.19*

The Effects of Two Way Interaction

	N_0	**N_1**	**N_2**	**45**	**60**	**75**		**45**	**60**	**75**
Summer	74.8^{b}	73.8^{b}	78.5^{ab}	76^{a}	76.2^{a}	75^{a}	N_0	65.27^{b}	69^{ab}	72.8^{a}
Autumn	52.2^{c}	56.9^{c}	51.2^{c}	47.1^{c}	53^{bc}	59.7^{b}	N_1	70.1^{ab}	69.5^{ab}	75.6^{a}
Winter	80.3^{ab}	84.4$_{a}$	83.1^{ab}	81.1^{a}	83.5^{a}	83.1^{a}	N_2	69^{ab}	74^{a}	69.4^{ab}
LSD $_{0.05}$	7.39*			9.35*				7.3*		

The Effects of Three Way Interaction

	N_0	**N_1**	**N_2**	**N_0**	**N_1**	**N_2**	**N_0**	**N_1**	**N_2**
	Summer			**Autumn**			**Winter**		
S_1	74.3^{a}	73^{ab}	77.3^{a}	46.7^{c}	52.1^{c}	57.8^{bc}	74.7^{a}	82.8^{a}	83.4^{a}
S_2	77.5^{a}	72^{ab}	72^{ab}	47.6^{c}	52.1^{c}	71.2^{ab}	85.2^{a}	84.5^{a}	83.6^{a}
S_3	76.1^{a}	83.6^{a}	75.6^{a}	47.2^{c}	56.3^{c}	50.2^{c}	83.6^{a}	83.1^{a}	82.5^{a}
LSD $_{0.05}$				*15.59**					

Table (3). Effect of sowing date, plant spacing and N fertilizer on 1000 seed weight in the 2nd year (kg).

The Main Effects

Date		**Fertilizer**		**Spacing**	
Summer	48.03^{c}	N_0	52.65^{a}	S_1	52.73^{a}
Autumn	51.26^{b}	N_1	52.28^{a}	S_2	51.70^{a}
Winter	57.58^{a}	N_2	51.95^{a}	S_3	52.45^{a}
LSD $_{0.05}$	2.88*		1.87		1.68*

The Effects of Two Way Interaction

	N_0	***N_1***	***N_2***	***45***	***60***	***75***		***45***	***60***	***75***
Summer	49.49^{bc}	46.58^{c}	48.03^{bc}	48.9^{bcd}	47.43^{d}	47.77^{bcd}	N_0	52.2^{a}	52.83^{a}	52.91^{a}
Autumn	51.98^{b}	50.98^{b}	50.91^{b}	51.41^{bc}	50.02^{bcd}	52.35^{b}	N_1	52.76^{a}	51.61^{a}	52.47^{a}
Winter	56.56^{a}	59.29^{a}	56.91^{a}	57.89^{a}	57.64^{a}	57.23^{a}	N_2	53.24^{a}	50.65^{a}	51.96$_{a}$
LSD $_{0.05}$	*3.89**			*2.7*				*2.92*		

The Effects of Three Way Interaction

	N_0	N_1	N_2	N_0	N_1	N_2	N_0	N_1	N_2
	Summer			***Autumn***			***Winter***		
S_1	49.07	46.61	51.04	51.71	51.94	50.57	55.84	59.73	58.11
S_2	49.96	46.43	45.09	51.32	49.47	49.28	57.21	58.94	56.77
S_3	49.45	46.7	47.16	52.66	51.52	52.88	56.63	59.2	55.85
$LSD_{0.05}$				*6.14*					

Table (4). Effect of Sowing date, Plant Spacing and N fertilizer on Plant Height 8th Week in the First Year (cm.).

The Main Effects

Date		**Fertilizer**		**Spacing**	
Summer	83.56^a	N_0	59.95^a	S_1	64.3^a
Autumn	59.24^b	N_1	60.54^a	S_2	60.42^b
Winter	37.57^c	N_2	59.88^a	S_3	55.64^c
$LSD_{0.05}$	5.19*		4.93*		2.12*

The Effects of Two Way Interaction

	N_0	N_1	N_2	***45***	***60***	***75***		***45***	***60***	***75***
Summer	82.3^a	83.1^a	85.2^a	87.8^a	84.6^a	78.1^b	N_0	65.26^a	59.03^{bcd}	55.5^{cd}
Autumn	61.5^b	59.08^b	57.1^b	64.2^c	59.9^d	53.5^e	N_1	63.8^{ab}	61.7^{ab}	55.9^{cd}
Winter	36.04^c	39.3^c	37.3^c	40.7^f	36.7^g	35.2^g	N_2	63.7^{ab}	60.4^{abc}	55.4^d
$LSD_{0.05}$	*8.64*			*5.93**				*5.78**		

The Effects of Three Way Interaction

	N_0	N_1	N_2	N_0	N_1	N_2	N_0	N_1	N_2
	Summer			**Autumn**			**Winter**		
S_1	85.33	86.53	91.73	70.5	63.0	59.26	39.93	42.2	40.26
S_2	82.5	84.8	86.73	59.46	62.3	57.93	35.13	38.2	36.8
S_3	79.06	78.16	77.3	54.6	51.93	54.13	33.06	37.8	34.86
$LSD_{0.05}$				*10.47**					

Table (5). Effect of Sowing date, Plant Spacing and N fertilizer on Plant Height 8th Week in the Second Year (cm.).

The Main Effects

Date		**Fertilizer**		**Spacing**	
Summer	71.13^a	N_0	61.16^b	S_1	67.8a
Autumn	60.95^b	N_1	63.91^a	S_2	61.92^b
Winter	55.80c	N_2	62.82^{ab}	S_3	58.16^c
$LSD_{0.05}$	1.68*		1.8*		1.01*

The Effects of Two Way Interaction

	N_0	N_1	N_2	***45***	***60***	***75***		***45***	***60***	***75***
Summer	71.33^a	71.33^a	70.73^a	74.93^a	70.73^b	67.73^c	N_0	66.08^a	60.37^c	56.26^d
Autumn	60.42^b	61.35^b	61.08^b	65.35^d	60.84^f	56.66^g	N_1	68.48^a	62.88^b	60.35^c
Winter	51.73^d	59.04^{bc}	56.64^c	63.13^e	54.2^h	50.08^i	N_2	68.08^a	62.51^{bc}	57.86^d
$LSD_{0.05}$	*3.04**			*2.18**				*2.30**		

The Effects of Three Way Interaction

	N_0	N_1	N_2	N_0	N_1	N_2	N_0	N_1	N_2
	Summer			**Autumn**			**Winter**		
S_1	75.46	74.33	75.0	64.4	65.66	66.0	60.66	65.46	63.26
S_2	70.66	70.66	70.86	60.93	60.66	60.93	49.53	57.33	55.73
S_3	67.86	69.0	66.33	55.93	57.73	56.33	45.0	54.33	50.93
$LSD_{0.05}$				*4.04*					

Effect of Sowing Date, Planting Spacing and N Fertilizer on Yield and Yield Components:

Data presented in Tables (2-9) showed that all yield and yield parameters are affect by sowing dates significantly. Similar observation agrees with Moniruzzman (2007) who studied the Response of Okra Seed Crop to Sowing Time and Plant Spacing in South eastern Hilly Region of Bangladesh stated that there was no significant difference in seed yield per hectare among the above four treatment combinations.

Also agrees with Alam *et al.,* 2007 studied (*Sesamum indicum*

L.) they reported that the highest number of branches plant-l, capsules plant-l, seeds capsule-l, seed yield (kg ha-l) were statistically identical to 10th March sowing except plant height, number of branches and capsule plant-l but all of them were recorded significantly lowest in 22 March sowing compared to first sowing. The highest seed yield (251.30kg ha-l) was obtained in 26 February sowing and thereafter reduced with delay in sowing.

These result are quite similar to the findings of Ozer (2003) who studied sowing date and nitrogen rate effects on growth, yield and yield components of two summer rapeseed cult Significant differences in branch numbers per plant occurred between the various spacing between rows. Generally, an increase in row spacing led to significantly higher branching. Another observation confirmed the findings of Carvalho *et al.*, who found that the number of pods per plant, number of seeds per pod, 1000-seed weight and seed yield were evaluated. Sowing on the first 2 weeks of May recorded a better seed yield than sowing on the first 2 weeks of July. Row spacing is another function, which affected the growth behavior of the cultivar.

This was consistent with the findings of Ali *et al*., (1996), who reported that low density resulted in an increased number of branches per plant. The highest number of pods per plant was recorded for 45 cm row spacing. The differences in this character between the three rows spacing (15, 30 and 45 cm) were large. Similarly, Momoh and Zhou (2001) stated that the number of effective branches and pods per branch decreased with increasing plant density

Ibrahim *et al.,* (1989) who studied the Response of rapeseed (*Brassica napus* L.) growth, yield, oil content and its fatty acids to nitrogen rates and application times and reported that high oil contents were correlated with cooler spring temperatures. Others also have found that oil content occurred when rapeseed was seeded in early May rather than toward the middle or end of June (Johnson *et al.*, 1995). It is likely that increased temperature and water stress during seed filling was a major cause of reduced oil concentration due to late sowing (Hocking and Stapper, 2001).

Similar observation confirmed the findings of Gesch *et al*., 2002 who stated that the highest seed oil content found was for the 1st June sowing in 2000, which was 284g kg^{1}. This is slightly lower than that previously reported (Knapp and Crane, 2000).

Plants developed from seed sown before June tended to form more branches and accumulated a greater amount of aboveground biomass. Typically, there was a distinct decrease in plant biomass accumulation and most seed yield components when sowing date was delayed until June. *Cuphea* can be successfully grown in the northern Corn Belt, with early to mid-May being the best time for sowing. Seed oil yield per hectare mirrored seed yield because seed oil content was relatively stable across sowing dates. The best sowing date for total oil yield was not as clear in 2000, as differences across the 15 April to 1 June were smaller than in 1999. Also agrees with Wilczewski1 *et al*., (2006) who reported that the nitrogen fertilization applied in the experiments significantly increased the over ground plant biomass yield of the crops researched. The greatest reaction to N fertilization was demonstrated by oil radish. The dry matter yield of this plant increased by 26.5% due to the application of 45 kg/ha, as compared with the yield collected from unfertilized objects. Increasing the nitrogen dose from 45 to 90 kg·ha-1 resulted in an 18.4% increase in the dry matter yield of radish. Also with the findings of Sarma and Kanjilal (2000), in India, who studied the effect of planting time and row spacing on growth and yield of patchouli (*Progesterone patchouli* Benth). They found that oil content and quality of oil as measured by the patchouli alcohol (64.2-66.1%) was not affected by planting time as well as spacing. While Ram, *et al*. (1998), found that planting of Mary gold (*Tagetes minuta*) in mid-October at 45×45cm, resulted in maximum oil yield with increase in plant height.

Data in Tables (10-11) indicated that the methanolic extracts of *Proboscidea parviflora* had significant effect on *Alternaia spp.* and *Fusarium oxysporium.* Khalil, (2001) reported that aqueous extracts of fruits and leaves of *Capsicum* fruitscens, *Capsicum* annum (Solanaceae) and *Nerium oleander* (Apocynaceae) inhibited the germination of *Alternaria solani* spores and decreased the mycelia dry weight of *Alternaria solani* and *Saprolengnia*. Similar observations was recorded by Tequida *et al.,* 2002 who evaluated the alcoholic extracts of leaves and stems of *Proboscidea parviflora* against the mould species *Aspergillus flavus, Aspergillus niger, Penicillium chrysogenum, Penicillium expansum, Fusarium poae* and *Fusarium moniliforme*. They found that the *Fusarium spp.* and *Penicillium spp*. were controlled by *Proboscidea parviflora*.

Also this findings agrees with Shahidi *et. al*., (2004) who studied the methanol plant-extracts of 221 species from 98 families which had documented uses in Iranian herbal-medicine with antibacterial and antifungal activity against 11 standard bacterial strains and 3 fungal species. They reported that *Proboscidea parviflora* one of the useful plant used in there experiment.

Similar observations agree with the findings of Okigbo and Ogbonnaya (2006). Who reported that the ethanolic extraction of *Ocimum gratissimum* inhibited more than that of *A. melegueta* the two plants extracts inhibited the spores of *Fusarium oxysporium* and *Aspergilus niger.* This observation could be attributed to the antifungal properties of *Proboscidea parviflora* acting against the growth of fungal species.

Hassan *et.al.,*(2005) stated that the alcoholic extracts of neem and garlic completely inhibited the presence of *Bipolaris sorokiniana*, *Fusarium spp., Aspergilus spp., Penicillium spp. and Rhizopus spp.* respectively on treated wheat seeds, whereas the highest percentage of *B. sorokiniana* (11.67%), *Fusariun spp.*(24.33%), *Aspergillus spp.* (17.07%), *Penicillium spp*. (7.5%) and *Rhizopus spp.*(4.5%).

Table (6). Effect of sowing date, plant spacing and N fertilizer on number of leaves/ plant in the 1st year:

The Main Effects

Date		Fertilizer		Spacing	
Summer	79.65^{b}	N_0	81.08^{a}	S_1	76.94^{c}
Autumn	99.05^{a}	N_1	87.7^{a}	S_2	85.75^{b}
Winter	75.28^{b}	N_2	85.2^{a}	S_3	91.29^{a}
LSD $_{0.05}$	8.98*		6.79*		2.97*

The Effects of Two Way Interaction

	N_0	***N_1***	***N_2***	***45***	***60***	***75***		***45***	***60***	***75***
Summer	74.83b	81.33b	82.8b	75.46	81.14	82.37	*N_0*	74.78	81.24	87.22
Autumn	97.29a	102.2a	97.67a	88.29	100.38	108.51	*N_1*	80.51	88.62	93.97
Winter	71.13b	79.56b	75.16b	67.09	75.76	83.0	*N_2*	75.53	87.41	92.67
LSD $_{0.05}$	*13.06*			*5.15**				*7.99**		

The Effects of Three Way Interaction

	N_0	***N_1***	***N_2***	***N_0***	***N_1***	***N_2***	***N_0***	***N_1***	***N_2***
	Summer			***Autumn***			***Winter***		
S_1	72.43	76.93	77.0	87.87	91.87	85.13	64.07	72.73	64.47
S_2	73.8	82.87	86.77	97.4	105.0	98.73	72.53	78.0	76.73
S_3	78.27	84.2	84.63	106.6	109.8	109.13	76.8	87.93	84.27
LSD $_{0.05}$				*15.59*					

Table (7). Effect of sowing date, plant spacing and N fertilizer on number of leaves/ plant in the 2nd year:

The Main Effects

Date		Fertilizer		Spacing	
Summer	58.27^{b}	N_0	54.15^{a}	S_1	48.09^{c}
Autumn	63.83^{a}	N_1	53.43^{a}	S_2	53.37^{b}
Winter	37.57^{c}	N_2	52.08^{a}	S_3	58.21^{a}
LSD $_{0.05}$	3.4*		2.92*		1.33*

The Effects of Two Way Interaction

	N_0	**N_1**	**N_2**	**45**	**60**	**75**		**45**	**60**	**75**
Summer	59.1^{bc}	60.24^{abc}	55.46^{c}	54.95^{d}	57.51^{c}	62.35^{b}	*N_0*	50.08^{cd}	54.13^{b}	58.25^{a}
Autumn	65.5^{a}	63.08^{ab}	62.91^{ab}	56.62^{cd}	64.86^{b}	70.01^{a}	*N_1*	48.53^{de}	53.53^{bc}	58.22^{a}
Winter	37.86^{d}	36.95^{d}	37.88^{d}	32.71^{g}	37.73^{f}	42.26^{e}	*N_2*	45.66^{e}	52.44^{bc}	58.15^{a}
LSD $_{0.05}$	*5.32**			*2.30**				*3.47**		

The Effects of Three Way Interaction

	N_0	***N_1***	***N_2***	***N_0***	***N_1***	***N_2***	***N_0***	***N_1***	***N_2***
	Summer			***Autumn***			***Winter***		
S_1	56.73	56.6	51.5	59.4	56.4	53.9	34.0	32.5	31.5
S_2	59.0	59.2	54.3	65.8	63.8	64.9	37.6	37.5	38.0
S_3	61.6	64.9	60.5	71.2	68.9	69.8	41.9	40.8	44.0
LSD $_{0.05}$				*6.46**					

Table (8). Effect of Sowing Date, Plant Spacing and N Fertilizer on Oil Percentage in the 1st Year.

The Main Effects

Date		Fertilizer		Spacing	
Summer	2.48^{a}	N_0	2.48^{a}	S_1	2.46^{a}
Autumn	2.19^{a}	N_1	2.32^{b}	S_2	2.21^{b}
Winter	2.48^{a}	N_2	2.35^{b}	S_3	2.47^{a}
LSD $_{0.05}$	0.41*		0.07*		0.15*

The Effects of Two Way Interaction

	N_0	N_1	N_2	45	60	75		45	60	75
Summer	2.46	2.40	2.56	2.74	2.22	2.46	N_0	2.54^{abc}	2.58^{ab}	2.32^{bcd}
Autumn	2.24	2.18	2.16	2.35	1.95	2.28	N_1	2.53^{abc}	1.91^{e}	2.52^{abc}
Winter	2.74	2.37	2.33	2.28	2.47	2.68	N_2	2.31^{cd}	2.15^{d}	2.59^{a}
$LSD_{0.05}$	*0.42**			*0.46**				*0.22**		

The Effects of Three Way Interaction

	N_0	N_1	N_2	N_0	N_1	N_2	N_0	N_1	N_2
	Summer			***Autumn***			***Winter***		
S_1	2.67^{abcdef}	2.8^{abc}	2.77^{abc}	$2.58^{abcdefg}$	2.27^{defghi}	2.19^{efghij}	$2.36^{cdefghi}$	2.53^{bcdefg}	1.97^{hijk}
S_2	$2.55^{abcdefg}$	1.67^{k}	$2.44^{bcdefgh}$	$2.33^{cdefghi}$	1.86^{ijk}	1.66^{k}	2.87^{ab}	2.19^{fghi}	$2.35^{cdefghi}$
S_3	2.16^{ghijk}	2.75^{abcd}	2.48^{bcdefg}	1.81jk	2.4^{cdefgh}	$2.62^{abcdefg}$	2.98^{a}	2.4^{cdefgh}	2.67^{abcde}
$LSD_{0.05}$				*0.50**					

Table (9). Effect of Sowing Date, Plant Spacing and N Fertilizer on Oil Percentage in the 2nd Year.

The Main Effects

Date		Fertilizer		Spacing	
Summer	2.82^{a}	N_0	2.59^{a}	S_1	2.59^{a}
Autumn	2.41^{b}	N_1	2.55^{a}	S_2	2.67^{a}
Winter	2.5^{ab}	N_2	2.65^{a}	S_3	2.52^{a}
$LSD_{0.05}$	0.27*		0.20*		0.22*

The Effects of Two Way Interaction

	N_0	N_1	N_2	45	60	75		45	60	75
Summer	2.94	2.65	2.87	2.77^{ab}	2.95^{a}	2.74^{abc}	N_0	2.52^{a}	2.79^{a}	2.47^{a}
Autumn	2.24	2.64	2.34	2.35^{cd}	2.6^{abcd}	2.27^{d}	N_1	2.46^{a}	2.62^{a}	2.58^{a}
Winter	2.60	2.36	2.72	2.66^{abcd}	2.47^{bcd}	2.56^{abcd}	N_2	2.80^{a}	2.62^{a}	2.52^{a}
$LSD_{0.05}$	*0.39**			*0.41**				*0.37**		

The Effects of Three Way Interaction

	N_0	N_1	N_2	N_0	N_1	N_2	N_0	N_1	N_2
	Summer			***Autumn***			***Winter***		
S_1	2.55^{cdef}	2.49^{cdef}	3.25^{ab}	2.58^{cdef}	2.27^{defg}	2.19^{efg}	2.42^{cdefg}	2.61^{bcdef}	2.96^{abc}
S_2	3.50^{a}	2.51^{cdef}	2.85^{abcd}	2.33^{cdefg}	3.26^{ab}	2.22^{defg}	2.54^{cdef}	2.09^{fg}	2.78^{bcde}
S_3	2.76^{bcde}	2.96^{abc}	2.52^{cdef}	1.81^{g}	2.39^{cdefg}	2.62^{bcdef}	2.84^{bcd}	2.39^{cdefg}	2.43^{cdefg}
$LSD_{0.05}$				*0.64**					

Table (10). The effect of alcoholic extract of *Proboscidea parviflora* on *Fusarium oxysporium*

Treatment	24hr	48hr	72hr	96hr	120hr	144hr	168hr	48hr
Leaves extract	29.97^{a}	35.1^{a}	40.2^{b}	42.56^{b}	44.53^{c}	49.33^{c}	54.67^{c}	35.1^{a}
Stem extract	27.57^{a}	31.5^{b}	33.9^{b}	37.33^{b}	42.87^{c}	49.43^{c}	50.53^{c}	31.5^{b}
Alcohol	27.63^{a}	32.3^{ab}	36.9^{b}	42.56^{b}	52.76^{b}	67.00^{b}	69.77^{b}	32.3^{ab}
Control	27.23^{a}	34.8^{ab}	47.2^{a}	55.53^{a}	64.67^{a}	77.90^{a}	86.23^{a}	34.8^{ab}
$LSD_{0.05}$	3.06	3.35	6.58	8.42	3.37	5.31	5.46	3.35

Table (11). The effect of alcoholic extract of *Proboscidea parviflora* on *Alternaria spp.*

Treatment	24hr	48hr	72hr	96hr
Leaves extract	58.10^{a}	65.30^{b}	69.20^{b}	7657^{b}
Stem extract	55.00^{a}	60.53^{d}	66.47^{b}	73.00^{b}
Alcohol	57.20^{ab}	63.10^{c}	69.57^{b}	75.63^{b}
Control	57.50^{b}	67.67^{a}	82.90^{a}	89.80^{a}
$LSD_{0.05}$	2.43	2.15	6.32	4.01

4. Conclusions

In this experiment, nitrogen levels showed significant effects on *Proboscidea parviflora* yield. The highest seed yield associated with the medium amount of Nitrogen fertilizer (50 Kg/fed.). Winter sowing and 60 cm as plant spacing gave the highest yield of fruits and seed which are rich of oil .The alcoholic extracts leaves and stem of *Proboscidea parviflora* had significant effect on *Alternaia spp.* and *Fusarium oxysporium*, they decrease the number of the two mould better than alcohol alone.

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